CLAIMS

What is claimed is:

1. A method of estimating an echo return loss of a communication link, comprising the steps of:

measuring a peak power value of a signal received from a far end of a communication link, within a power period;

measuring a peak power value of a signal received from a near end of said communication link, within an echo period corresponding to said power period; and

calculating said echo return loss estimate, for said power period, as a ratio of said far-end peak power value to said near-end peak power value, wherein

said far-end signal comprises payload information that said communication link was established to convey, and

said near-end signal includes coupled signal power echo from said far-end signal.

2. The method of claim 1, further comprising the steps of:

initiating the start of a first power period when a first peak is detected in said far-end signal power; and

terminating said first power period when a predetermined period of time has expired since initiating said start of said first period.

3. The method of claim 2, further comprising the step of:

reinitiating the start of said first power period upon detection of a second peak within said first power period greater than said first peak.

4. The method of claim 2, further comprising the step of:

initiating the start of a second period upon the detection of a peak after the termination of said first period.

5. The method of claim 2, wherein:

said peak must be above a threshold value set to differentiate speech received from said far end of said communication link form noise received from said far end.

6. The method of claim 1, further comprising the steps of:

estimating near-end noise within said near-end signal;

synthesizing said estimated near-end noise; and

subtracting said synthesized near-end noise from said near-end signal before measuring said near-end peak power value.

7. The method of claim 1, further comprising the steps of:

multiplying a base ten logarithm of said far-end peak power value by a value of about ten and ascribing the product to a first decibel value;

multiplying a base ten logarithm of said near-end peak power value by a value of about ten and ascribing the product to a second decibel value; and

subtracting said second decibel value from said first decibel value to obtain said echo return loss estimate for said power period.

8. The method of claim 4, further comprising the step of:

for each one of a plurality of sequential periods, j, calculating a refined estimate of said echo return loss based on estimated echo return loss values for a current power period and a number of prior power periods.

9. The method of claim 8, wherein:

said refined echo return loss estimate is calculated using a formula that allows the refined estimate to increase in value at a greater rate than it may decrease in value.

10. The method of claim 9, wherein:

when said echo return loss estimate for said current power period is greater than or equal to said refined echo return loss estimate for one of said number of prior power periods, calculating said refined echo return loss estimate for said current power period comprises the calculation given by:

$erl_{ref,\ current} = ((1 - a1) * erl_{ref,\ prior}) + (a1 * erl_j)$; and

when said echo return loss for said current power period is less than said refined echo return loss estimate for one of said number of prior power periods, calculating said refined echo return loss estimate for said current power period comprises the calculation given by:

$erl_{ref,\ curent} = ((1 - a2) * erl_{ref,\ prior}) + (a2 * erl_j)$, where

$0 \leq a2 \leq a1 \leq 1$,

$erl_{ref,\ current}$ is said refined echo return loss for said current power period,

$erl_{ref,\ prior}$ is said refined echo return loss for one of said prior power periods, and

erl_j is said echo return loss estimate for said current power period.

11. The method of claim 10, further comprising the step of:

initializing the value of said refined echo return loss estimate for a first one of said number of periods to about 6 dB.

12. The method of claim 10, further comprising the steps of:

when in a first state machine state, transitioning to a second state machine state when a difference of said refined echo return loss estimate, for one of said number of prior power periods, less a first subtrahend exceeds said echo return loss estimate for said current power period;

when in said second state, transitioning to said first state when said difference is less than or equal to said echo return loss estimate for said current power period;

when in said second state, transitioning to a third state machine state when a wait period has expired, since last entering said second state, without an intervening transition to said first state; and

when is said third state, transitioning to said first state when said difference is less than or equal to said echo return loss estimate for said current power period.

13. The method of claim 12, further comprising the step of:

refraining from calculating said refined echo return loss estimate while said state machine is in said second state.

14. The method of claim 13, further comprising the step of:

refraining from calculating said refined echo return loss estimate when said echo return loss estimate for said current power period is less than or equal to about 6 dB.

15. The method of claim 14, wherein:

said payload information is part of a conversation between a near-end user and a far-end user; and

said echo return loss estimate is dynamically and repeatedly calculated during said conversation.

16. A method of estimating an echo return loss of a communication link, comprising the steps of:

measuring a peak power value of a signal received from a far end of a communication link, within a filter length period;

measuring a peak power value of a signal received from a near end of said communication link, within said filter length period; and

calculating said echo return loss estimate, for said filter length period, as a ratio of said far-end peak power value to said near-end peak power value, wherein

said far-end signal includes the speech of a far-end user; and

said near-end signal includes echoed speech from said far-end signal.

17. The method of claim 16, wherein:

said near-end signal also includes the speech of a near-end user and near-end background noise.

18. The method of claim 17, wherein:

said echo return loss estimate is dynamically and repeatedly calculated during a conversation between said near-end and far-end users.

19. The method of claim 16, wherein:

said echo return loss estimate is based on the ratio of said far-end user speech power to said echo power and said estimate is not calculated when said near end power is close to or

exceeds said far end user speech power, indicating that said near end power contains more than far end echo.

20. Apparatus for estimating an echo return loss of a communication link, comprising:

a measuring unit operatively connected to receive signals from the near-end and the far-end of a communication link and enabled to detect peak power values of said signal received from said far end of a communication link; and enabled to measure corresponding peak power values of said signal received from said near end of said communication link; and

a comparator for estimation of said echo return loss as a ratio of said far-end peak power value to said corresponding near-end peak power value, wherein

said far-end signal is comprised of the speech of a far-end user; and

said near-end signal is comprised of echoed speech from said far-end signal.